CLAIMS

What is claimed is:

1. A method of preparing a ligament xenograft for implantation into a human, which comprises:

(a) removing at least a portion of a ligament from a non-human animal to provide a xenograft;

(b) washing the xenograft in water and alcohol;

(c) subjecting the xenograft to a cellular disruption treatment; and

(d) digesting the xenograft with a glycosidase to remove substantially a plurality of first surface carbohydrate moieties from the xenograft,

wherein the glycosidase has a concentration in a range of about 1 mU/ml to about 1000 U/ml, and

whereby the xenograft has substantially the same mechanical properties as a corresponding portion of a native ligament.

2. The method of claim 1, further comprising the step of:

subsequent to the glycosidase digesting step, treating a plurality of second surface carbohydrate moieties on the xenograft with a plurality of capping molecules to cap at least a portion of the second surface carbohydrate moieties,

whereby the xenograft is substantially non-immunogenic.

3. The method of claim 2, wherein the capping step comprises:

treating the second surface carbohydrate moieties on the xenograft with the capping molecules having a concentration in a range of about .01 mM to about 100 mM.

4. The method of claim 2, wherein at least a portion of the capping molecules are sialic acid molecules.

5. The method of claim 1, wherein the glycosidase is a galactosidase.

6. The method of claim 5, wherein the galactosidase is an -galactosidase.

7. The method of claim 1, wherein the cellular disruption treatment comprises freeze/thaw cycling.

8. The method of claim 1, wherein the cellular disruption treatment comprises exposure to gamma radiation.

9. The method of claim 1, wherein the removing step comprises removing with the portion a first block of bone attached to a first end of the portion.

10. The method of claim 9, wherein the removing step comprises removing with the portion a second block of bone affixed to a second end of the portion opposite the first end.

11. The method of claim 1 further comprising the step of following step (c), exposing the xenograft to a crosslinking agent in a vapor form.

12. A method of preparing a meniscal xenograft for implantation into a human, which comprises:

(a) removing at least a portion of a ligament from a non-human animal to provide a xenograft;

(b) washing the xenograft in water and alcohol;

(c) subjecting the xenograft to a cellular disruption treatment;

(d) digesting the xenograft with a glycosidase to remove substantially a plurality of first surface carbohydrate moieties from the xenograft; and

(e) treating a plurality of second surface carbohydrate moieties on the xenograft with a plurality of sialic acid molecules to cap at least a portion of the second surface carbohydrate moieties,

whereby the xenograft is substantially non-immunogenic and has substantially the same mechanical properties as a corresponding portion of a native ligament.

13. The method of claim 12, wherein the capping step comprises:
treating the second surface carbohydrate moieties on the xenograft with the sialic acid molecules having a concentration in a range of about .01 mM to about 100 mM.

14. The method of claim 12, wherein at least the glycosidase is a galactosidase.

15. The method of claim 14, wherein at least the galactosidase is an -galactosidase.

16. The method of claim 12, wherein the cellular disruption treatment comprises freeze/thaw cycling.

17. The method of claim 12, wherein the cellular disruption treatment comprises exposure to gamma radiation.

18. The method of claim 12, wherein the removing step comprises removing with the portion a first block of bone attached to a first end of the portion.

19. The method of claim 18, wherein the removing step comprises removing with the portion a second block of bone affixed to a second end of the portion opposite the first end.

20. The method of claim 12 further comprising the step of:
following step (c), exposing the xenograft to a crosslinking agent in a vapor form.

21. An article of manufacture comprising a substantially non-immunogenic ligament xenograft for implantation in to a human, produced by

(a) removing at least a portion of a ligament from a non-human animal to provide a xenograft;

(b) washing the xenograft in water and alcohol;

(c) subjecting the xenograft to a cellular disruption treatment; and

(d) digesting the xenograft with a glycosidase to remove substantially a plurality of first surface carbohydrate moieties from the xenograft,

wherein the glycosidase has a concentration in a range of about 1 mU/ml to about 1000 U/ml, and

whereby the xenograft has substantially the same mechanical properties as a corresponding portion of a native ligament.

22. The article of manufacture of claim 21, further produced by:

subsequent to the glycosidase digesting step, treating a plurality of second surface carbohydrate moieties on the xenograft with a plurality of capping molecules to cap at least a portion of the second surface carbohydrate moieties on the xenograft,

whereby the xenograft is substantially non-immunogenic.

23. The article of manufacture of claim 22, wherein the capping molecules have a concentration in a range of about .01 mM to about 100 mM.

24. The article of manufacture of claim 22, wherein at least a portion of the capping molecules are sialic acid molecules.

25. The article of manufacture of claim 21, wherein the glycosidase is a galactosidase.

26. The article of manufacture of claim 25, wherein the galactosidase is an -galactosidase.

27. The article of manufacture of claim 21, wherein the cellular disruption treatment comprises freeze/thaw cycling.

28. The article of manufacture of claim 21, wherein the cellular disruption treatment comprises exposure to gamma radiation.

29. The article of manufacture of claim 21, wherein the removing step comprises removing with the portion a first block of bone attached to a first end of the portion.

30. The article of manufacture of claim 29, wherein the removing step comprises removing with the portion a second block of bone affixed to a second end of the portion opposite the first end.

31. The article of manufacture of claim 21 further comprising the step of following step (c), exposing the xenograft to a crosslinking agent in a vapor form.

32. An article of manufacture comprising a substantially non-immunogenic ligament xenograft for implantation in to a human, produced by:

(a) removing at least a portion of a ligament from a non-human animal to provide a xenograft;

(b) washing the xenograft in water and alcohol;

(c) subjecting the xenograft to a cellular disruption treatment;

(d) digesting the xenograft with a glycosidase to remove substantially a plurality of first surface carbohydrate moieties from the xenograft; and

(e) treating a plurality of second surface carbohydrate moieties on the xenograft with a plurality of sialic acid molecules to cap at least a portion of the second surface carbohydrate moieties,

whereby the xenograft is substantially non-immunogenic and has substantially the same mechanical properties as a corresponding portion of a native meniscus.

33. The article of manufacture of claim 32, wherein the sialic acid molecules have a concentration in a range of about .01 mM to about 100 mM.

34. The article of manufacture of claim 32, wherein the glycosidase is a galactosidase.

35. The article of manufacture of claim 34, wherein the galactosidase is an -galactosidase.

36. The article of manufacture of claim 32, wherein the cellular disruption treatment comprises freeze/thaw cycling.

37. The article of manufacture of claim 32, wherein the cellular disruption treatment comprises exposure to gamma radiation.

38. The article of manufacture of claim 32, wherein the removing step comprises removing with the portion a first block of bone attached to a first end of the portion.

39. The article of manufacture of claim 38, wherein the removing step comprises removing with the portion a second block of bone affixed to a second end of the portion opposite the first end.

40. The article of manufacture of claim 32 further comprising the step of:
following step (c), exposing the xenograft to a crosslinking agent in a vapor form.

41. A ligament xenograft for implantation into a human comprising:
a portion of a ligament from a non-human animal, wherein the portion includes a plurality of extracellular components and a plurality of substantially only dead cells, the extracellular components and the dead cells having substantially no surface -galactosyl moieties and having a plurality of sialic acid molecules linked to at least a portion of a plurality of surface carbohydrate moieties on the xenograft,
whereby the portion of the ligament is substantially non-immunogenic and has substantially the same mechanical properties as a corresponding portion of a native ligament.

42. The ligament xenograft of claim 41, wherein the portion of the ligament has a first block of bone attached to a first end thereof.

43. The ligament xenograft of claim 42, wherein the portion of the ligament has a second block of bone affixed to a second end thereof opposite the first end.